

What is claimed is:

Claim 1. An aerosol deflection system comprising:

a concentration zone configured to expel an air stream through a first detection zone, a second detection zone, and a deflection zone;

said first detection zone configured to activate said second detection zone based upon detection of a suspect aerosol of a pre-selected size;

said second detection zone configured to activate said deflection zone when said suspect aerosol of said pre-selected size has a predetermined signature; and

said deflection zone configured to direct a pressure pulse at said suspect aerosol having said predetermined signature to deflect the suspect aerosol from said air stream.

Claim 2. The system of claim 1, wherein said suspect aerosol is a pathogenic biological aerosol.

Claim 3. The system of claim 2, wherein the system deflects said suspect aerosol from ambient air with an enrichment factor about 6×10^6 .

Claim 4. The system of claim 1, further comprising a collection zone configured to collect said suspect aerosols deflected by said deflection zone, said collection zone comprising one or more pathogen identification devices configured to further analyze said suspect aerosols deflected by said deflection zone.

Claim 5. The system of claim 1, wherein said predetermined signature is a predetermined LIBS signature.

Claim 6. The system of claim 1, wherein said predetermined signature is a predetermined LIF signature.

Claim 7. The system of claim 6, wherein said second detection zone comprises:

a light source configured to radiate light at said suspect aerosol of said pre-selected size; and

a spectrally resolved photo-detector configured to detect a resultant LIF signature.

Claim 8. The system of claim 7, further comprising an integrated circuit in parallel communication with said spectrally resolved photo-detector, said integrated circuit having said predetermined LIF signatures resident thereon for comparison with said resultant LIF signature.

Claim 9. The system of claim 7, wherein said spectrally resolved photo-detector comprises at least two channels.

Claim 10. The system of claim 7, wherein said spectrally resolved photo-detector comprises at least thirty-two channels.

Claim 11. The system of claim 1, wherein said pressure pulse is selected from the group consisting of a positive pressure pulse, a negative pressure pulse, and any combination of the foregoing.

Claim 12. The system of claim 1, wherein said first detection zone is further configured to activate said second detection zone based upon elastic scattering signals.

Claim 13. A method for deflecting aerosols from ambient air, comprising:

generating a defined stream of the ambient air;

causing a suspected aerosol suspended in said defined stream to emit a signature when said suspect aerosol has a predetermined size;

detecting said signature from said suspected aerosol; and

removing said suspected aerosol from said defined stream via a pressure pulse when said signature is a predetermined signature.

Claim 14. The method of claim 13, further comprising removing said suspected aerosol from said defined stream in less than about 100 microseconds from the time said suspected aerosol is caused to emit said signature.

Claim 15. The method of claim 13, wherein suspected aerosols are removed from said defined stream with an enrichment factor of about 6×10^6 .

Claim 16. The method of claim 13, further comprising analyzing said suspect aerosol after removing it from said defined stream.

Claim 17. The method of claim 13, wherein said pressure pulse is selected from the group consisting of a positive pressure pulse, a negative pressure pulse, and any combination of the foregoing.

Claim 18. The method of claim 13, further comprising receiving elastically scattered signals from at least two laser beams to determine said predetermined size.

• Claim 19. The method of claim 18, wherein removing said suspected aerosol is further based on said elastically scattered signals.

Claim 20. The method of claim 13, wherein said signature is a LIBS signature or a LIF signature.